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(71)出願人　000001007
キヤノン株式会社
東京都大田区下丸子３丁目30番２号

(72)発明者　網本　満
東京都大田区下丸子３丁目30番２号　キヤノン株式会社内

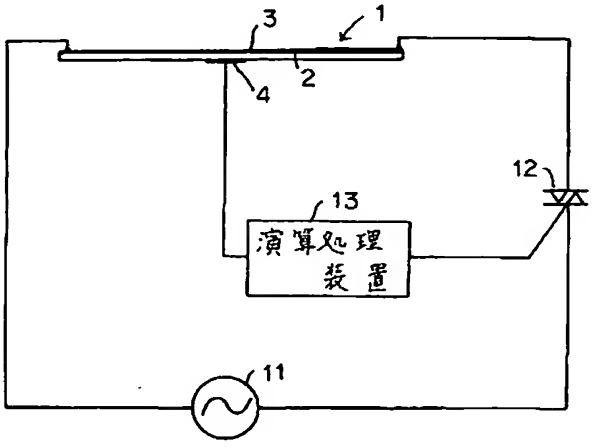
(74)代理人　弁理士　高梨　幸雄

(54)【発明の名称】　加熱体の制御装置、及び熱定着装置

(57)【要約】　(修正有)

【目的】　通電発熱体の抵抗値をあらかじめ設定することなく、あるいは画像熱定着装置にあっては複写開始時に仮通電することなく、適正な電力を供給することができ、加熱体または熱定着装置の温度を一定に保つこと。

【構成】　通電発熱体３又はそれを含む加熱体１の温度を検出する検出手段４と、該検出手段４の信号から前記通電発熱体３又は加熱体１のあらかじめ設定しておいた期間内での温度の時間的変化率を測定する測定手段１３と、該測定手段１３の測定結果をもとに前記通電発熱体３に供給する電力を制御する電力制御装置１２を備えたこと。



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【特許請求の範囲】

【請求項１】　通電発熱体又はそれを含む加熱体の温度を検出する検出手段と、該検出手段の信号から前記通電発熱体又は加熱体のあらかじめ設定しておいた期間内での温度の時間的変化率を測定する測定手段と、該測定手段の測定結果をもとに前記通電発熱体に供給する電力を制御する電力制御装置を備えたことを特徴とする加熱体の制御装置。

【請求項２】　低熱容量線状発熱体を有し、前記発熱体の温度を検出する検出手段を有し、前記検出手段の信号から前記発熱体のあらかじめ設定しておいた期間内での温度の時間的変化率を測定する測定手段と、該測定手段の測定結果をもとに前記発熱体に供給する電力を制御する電力制御装置を備えたことを特徴とする熱定着装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、通電発熱体又はそれを含む加熱体の制御装置、及び熱定着装置に関する。

【０００２】

【従来の技術】従来、例えば、セラミックヒーター等の低熱容量線状加熱体を用いた画像熱定着装置において、加熱体の温度を所定の略一定に保つために加熱体の通電発熱体への供給電力制御は、検出温度と、あらかじめ設定しておいた温度とを比較してその比較結果に応じて供給電力を変えていた（特開平２－２５９７９３号）。さらにヒーター（発熱体）抵抗値のばらつきの影響をおさえるため、ヒーター抵抗値をあらかじめ設定しておいた抵抗値範囲のコードに対応させ、このコードに応じて前記供給電力の制御グループを変えたり（特願平２－８０１６号）、発熱体へ仮通電を行ない、昇温度合に応じて電力を制御する（特開平２－１６３７８７号）ものがあった。

【０００３】

【発明が解決しようとする課題】しかしながら、上記従来例ではヒーター抵抗値を測定し、ヒーター抵抗値に対するコードをディップスイッチ等によりあらかじめ設定しておく手間が必要であった。あるいは仮通電する時間が必要なため、瞬時スタート（クイックスタート性）の要求される画像形成装置への応用へは適さなかった。

【０００４】そこで本発明は、通電発熱体又はそれを含む加熱体について、ヒーター抵抗値をあらかじめ設定することなく、あるいは仮通電することなく、適正な電力を供給して加熱体の温度を所定の略一定に維持制御することができる制御装置、及び熱定着装置を提供することを目的とする。

【０００５】

【課題を解決するための手段】本発明は、通電発熱体又はそれを含む加熱体の温度を検出する検出手段と、該検出手段の信号から前記通電発熱体又は加熱体のあらかじめ設定しておいた期間内での温度の時間的変化率を測定する測定手段と、該測定手段の測定結果をもとに前記通電発熱体に供給する電力を制御する電力制御装置を備えたことを特徴とする加熱体の制御装置、である。

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【０００６】また本発明は、低熱容量線状発熱体を有し、前記発熱体の温度を検出する検出手段を有し、前記検出手段の信号から前記発熱体のあらかじめ設定しておいた期間内での温度の時間的変化率を測定する測定手段と、該測定手段の測定結果をもとに前記発熱体に供給する電力を制御する電力制御装置を備えたことを特徴とする熱定着装置、である。

【０００７】

【作用】即ち本発明は、発熱体への通電開始後に、あらかじめ設定しておいた期間の温度変化率を測定し、測定結果に応じて供給電力の制御グループを変えることで、ヒーター抵抗値をあらかじめ設定することなく、あるいは画像加熱定着装置にあっては複写開始時に仮通電することなく、適正な電力を供給することができ、加熱体または熱定着装置の温度を一定に保つことができた。

【０００８】

【実施例】

＜実施例１＞（図１～図５）

本実施例は低熱容量線状加熱体を用いたフィルム加熱方式の画像熱定着装置に本発明を適用したものである。

【０００９】（１）定着装置の概略構成（図１）

５はエンドレスベルト状の定着フィルムであり、左側の駆動ローラ６と、右側の従動ローラ７と、この両ローラ６・７間の下方に固定支持させて配設した加熱体としての低熱容量線状加熱体１と、駆動ローラ６の下方に配設したガイドローラ６ａとの、互いに並行な該４部材６・７・１・６ａ間に懸回張設してある。

【００１０】従動ローラ７は定着フィルム５のテンションローラを兼ねさせてあり、定着フィルム５は駆動ローラ６の時計方向の回転駆動に伴ない時計方向に所定の周速度をもってシワや蛇行、速度遅れなく回動駆動さる。

【００１１】８は加圧部材としての、シリコンゴム等の離型性の良いゴム弾性層を有する加圧ローラで、前記のエンドレスベルト状定着フィルム５の下行側フィルム部分を加熱体１との間に挟ませて加熱体１の下面に対して不図示の付勢手段により例えば総圧４～７ｋｇの当接圧をもって対向圧接させてあり、不図示の画像形成部（Ａ）からの転写材（記録材）９の搬送方向に順方向の反時計方向に回転する。

【００１２】回動駆動されるエンドレスベルト状の定着フィルム５は繰り返してトナー画像の加熱定着に供されるから、耐熱性・離型性・耐久性に優れ、一般的には１００μｍ以下、好ましくは４０μｍ以下の薄肉のものを使用する。例えばポリイミド・ポリエーテルイミド・ＰＥＳ・ＰＦＡ（４フッ化エチレンーパーフルオロアルキルビニルエーテル共重合体樹脂）などの耐熱樹脂の単層フィルム、或いは複合層フィルム、例えば、２０μｍ厚

の耐熱性フィルムの少なくとも画像当接面側にＰＴＦＥ（４フッ化エチレン樹脂）・ＰＡＦ等のフッ素樹脂や更にはそれに導電材を添加した離型性コート層を１０μｍ厚に施したものなどである。

【００１３】加熱体としての低熱容量線状加熱体１は、本例のものは、定着フィルム横断方向（定着フィルム５の走行方向に直角な方向）を長手とする横長のヒーター基板２と、該基板２の定着フィルム５に対面する側の面に長手に沿って線状又は細帯状に形成具備させた発熱体としての通電発熱体層３と、その反対側のヒーター基板面に設けた温度検出素子４等からなる。１Ａはこの加熱体を支持させたヒーター支持体である。

【００１４】ヒーター支持体１Ａは加熱体１を定着装置や画像形成装置に断熱して支持する部材であり、例えばＰＰＳ（ポリフェニレンサルファイド）、ＰＡＩ（ポリアミドイミド）、ＰＩ（ポリイミド）、ＰＥＥＫ（ポリエーテルエーテルケトン）、液晶ポリマー等の高耐熱性樹脂、これらの樹脂とセラミックス・金属・ガラス等との複合材などで構成できる。

【００１５】ヒーター基板２は耐熱性かつ電気絶縁性を有するもので、一例として、厚み１．０ｍｍ・巾１０ｍｍ・長さ２４０ｍｍのアルミナ基板である。或はこれを含む複合材基板である。

【００１６】発熱体層３は、一例として、基板２のフィルム摺動側である下面の略中央部分に長手に沿ってＴａ２Ｎ・銀パラジウム等の電気抵抗材料を巾１．０ｍｍに塗工（スクリーン印刷等）して具備させた線状もしくは帯状の低熱容量の通電発熱体層であり、長手方向両端より通電される（図２）。

【００１７】温度検出素子４は例えばサーミスタで、通電発熱体層３を設けた側とは反対側のヒーター基板２面に当接させて配置してある。本例ではヒーター基板２の温度を加熱体１の温度として該温度検出素子４で検出させている。

【００１８】画像形成スタート信号により画像形成装置が像形成動作して画像形成部（Ａ）側から定着装置へ搬送された、未定着のトナー画像１０を上面に担持した転写材９はガイドに案内されて加熱体１と加圧ローラ８との圧接部Ｎ（定着ニップ部）の定着フィルム５と加圧ローラ８との間に進入して、未定着トナー画像面が面移動状態の定着フィルム５の下面に密着して面ズレやしわ寄りを生じることなく移動定着フィルム５と一緒の重なり状態で加熱体１と加圧ローラ８との定着ニップ部Ｎを狭圧力を受けつつ通過していく。

【００１９】転写材７のトナー画像担持面は定着フィルム面に押圧密着状態で定着ニップ部Ｎを通過していく過程で発熱体層３の熱を定着フィルム５を介して受け、トナー画像が高温溶融して転写材９面に軟化接着化１０ａする。

【００２０】本例装置の場合は転写材９と定着フィルム５との分離は転写材９が定着ニップ部Ｎを通過して出た時点で行なわせている。

【００２１】定着フィルム５と分離された転写材はガイドで案内されて排紙部へ至る間に固化するに至り、画像定着済みの転写材が出力される。

【００２２】（２）発熱体に対する供給電力制御

加熱体１の発熱体層３への通電は図２のようにその長手方向両端よりなされ、交流電源１１からの交流電流をトライアック等の電力制御素子１２によって例えば波数制御する。演算処理装置１３は、温度検出素子４からの信号をもとに、次のように電力制御素子１２を制御する。

【００２３】今、定着装置の目標温度は、１６５℃一定で、その近傍の温度での電力制御を細かく行う目的で、５段階の温度に対して電力供給量を変えるものである。検出温度を１５９℃、１６３℃、１６９℃、１７７℃で区切り、５段階に分類する。分類した温度に対応して図３の例えばＡグループの波形パターンで電力を供給する。

【００２４】ここでは発熱体層３への供給波形は、周期を２０ｍｓｅｃ、半波８個を制御単位とし、最大供給量を８波として、７波、６波、５波、４波、３波、２波、１波、０波の９種類に分けて、一つの制御グループに対して５種類の波数で制御する。また、ここではＡ～Ｃの３つの制御グループに分ける。そして、図４に示すフローにより制御グループを決定する。

【００２５】温度上昇率を１００℃から１５０℃になるまでの時間と定義しておく。まず、あらかじめ制御グループを例えばＡグループに仮設定しておく（Ｓ１）。演算処理装置１３は通電を開始すると、逐次、温度を検出し、温度に見合った波形をＡグループの中から選び電力を供給する。ここでは、初期温度が１００℃以上の時はＳ８へ飛ぶ。初期温度が１００℃以下の時はＳ３の処理へ移る（Ｓ２）。

【００２６】検出温度が１００℃を越えると（Ｓ３）、タイマーがカウントアップを始め（Ｓ４）、１５０℃を越えるとカウントをやめる（Ｓ５）。１５９℃を越えるまでは最大供給量である８波分が一定に供給されるため、温度上昇率はヒーター自身のばらつきや環境温度等を反映したものとなる。

【００２７】その温度上昇率に応じた制御グループを表１に従って選択し（Ｓ６）、１５０℃を越えてからは選択された制御グループに移るようにする（Ｓ７）。

【００２８】表　１

【００２９】

【表１】

０．９０秒以内	グループＣ
０．９０～１．４０秒以内	グループＢ
１．４０秒以上	グループＡ

図５では温度上昇率は１．２８秒であるので、Ｂグルー

プの制御に移っている。図５は本実施例での定着装置の温度の時間変化をプロットしたものである。

【００３０】Ｓ８では、すでにこの前に少なくとも一度は通電されているものとして、以前のグループ情報をもとに制御を行う。

【００３１】＜実施例２＞（図６・図７）

第２の実施例を図６のフローに従って述べる。

【００３２】本実施例も実施例１と同様に電力は波数制御を行うものとする。温度上昇率を１００℃を越えてから１秒後の温度と定義する。

【００３３】まず、あらかじめ制御グループを例えばＡグループに仮設定しておく（Ｓ９）。演算処理装置１３は通電を開始すると、逐次、温度を検出し、温度に見合った波形をＡグループの中から選び電力を供給する。ここでは、初期温度が１００℃以上の時は、Ｓ１６へ飛ぶ。初期温度が１００℃以下の時は、Ｓ１１の処理へ移る（Ｓ１０）。

【００３４】検出温度が１００℃を越えると（Ｓ１１）タイマーがスタートし（Ｓ１２）、１秒経過した時点の（Ｓ１３）温度を検出する。

【００３５】その温度上昇率に応じた制御グループを表２に従って選択し（Ｓ１４）、１５０℃を越えてからは選択された制御グループに移るようにする（Ｓ１５）。

【００３６】表　２

【００３７】

【表２】

１４０℃以下	グループＡ
１４０～１５５℃以内	グループＢ
１５５℃以上	グループＣ

図７では、温度上昇率は１４５℃であるので、Ｂグループの制御に移っている。図７は本実施例での定着装置の温度の時間変化をプロットしたものである。

【００３８】Ｓ１６では、すでにこの前に少なくとも一度は通電されているものとして、以前のグループ情報を＊もとに制御を行う。

【００３９】＜実施例３＞（図８）

本実施例は、電力は位相制御を行うものとした。前述の実施例と同様に例えば図８のような位相角で制御する。そして前述のフローに従って制御グループを選択する。

【００４０】

【発明の効果】以上述べたように本発明によれば、発熱体への通電開始後に、あらかじめ設定しておいた期間の温度変化率を測定し、測定結果に応じて供給電力の制御グループを変えることで、ヒーター抵抗値をあらかじめ設定することなく、あるいは画像熱定着装置にあっては複写開始時に仮通電することなく、適正な電力を供給することができ、加熱体または熱定着装置の温度を一定に保つことができる。

【図面の簡単な説明】

【図１】　実施例の熱定着装置の概略構成図

【図２】　実施例１及び実施例２における電力制御回路のブロック図

【図３】　実施例１及び実施例２における供給電力波形グループ選択図

【図４】　実施例１における電力制御のフローチャート

【図５】　実施例１における検知温度の時間的変化グラフ

【図６】　実施例２における電力制御のフローチャート

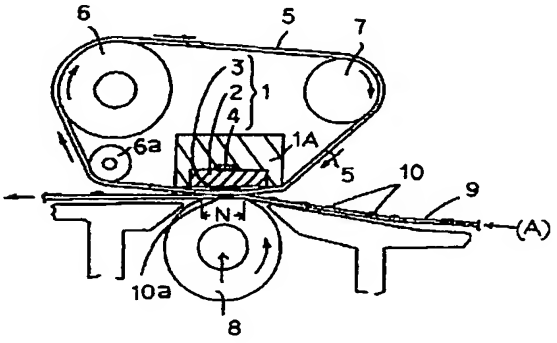
【図７】　実施例２における検知温度の時間的変化グラフ

【図８】　実施例３における供給電力波形グループ図

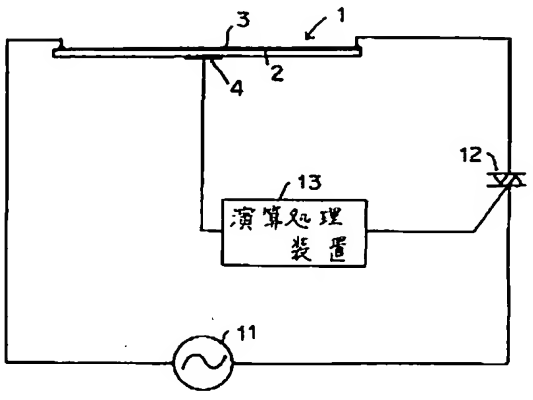
【符号の説明】

１　加熱体
２　ヒーター基板
３　発熱体層
４　温度検出素子
１１　交流電源
１２　電力制御素子
１３　演算処理装置

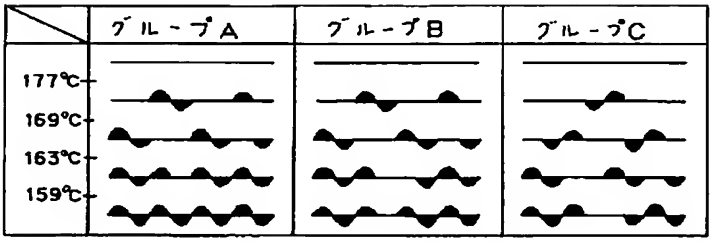
【図１】



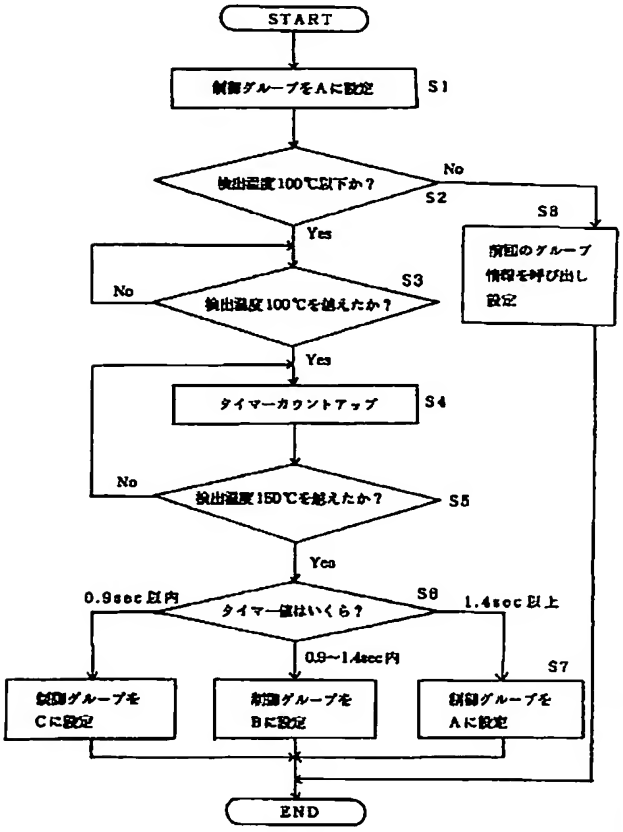
【図２】



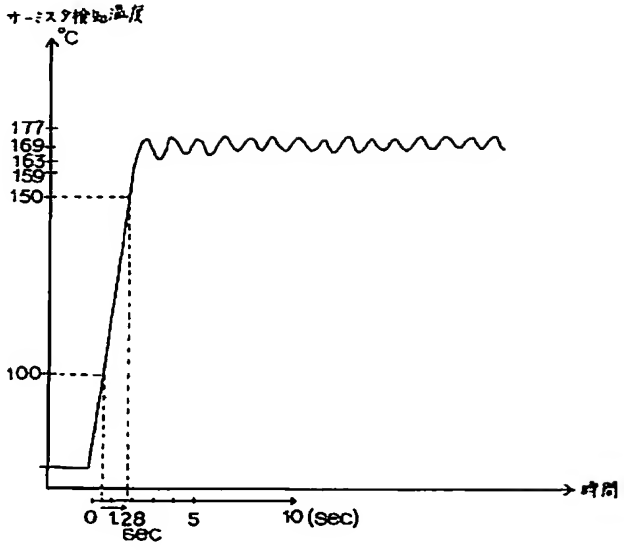
【図３】


グループA
グループB
グループC
177℃
169℃
163℃
159℃

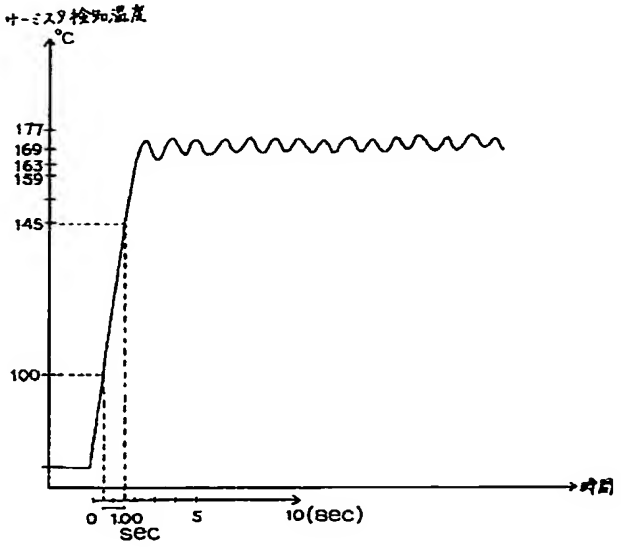
【図４】


START
制御グループをAに設定
S1
検出温度100℃以下か？
No
S2
Yes
S8
前回のグループ情報を呼び出し設定
No
検出温度100℃を越えたか？
S3
Yes
タイマーカウントアップ
S4
No
検出温度150℃を越えたか？
S5
Yes
0.9sec以内
タイマー値はいくら？
S6
1.4sec以上
0.9～1.4sec内
S7
制御グループをCに設定
制御グループをBに設定
制御グループをAに設定
END

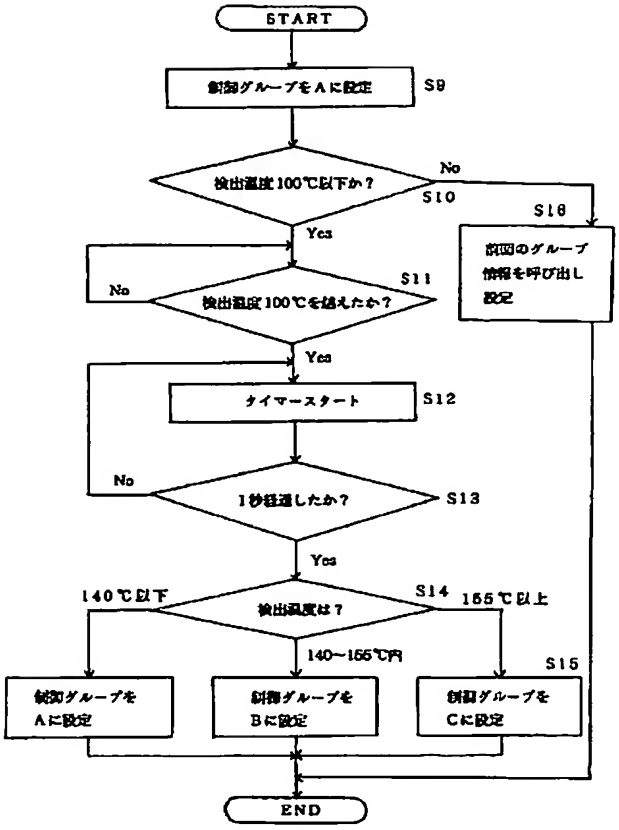
【図５】


サーミスタ検知温度
℃
177
169
163
159
150
100
時間
0
1.28
sec
5
10(sec)

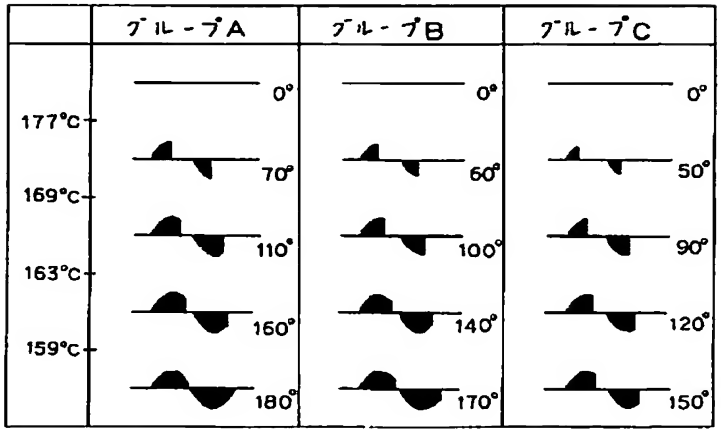
【図７】


サーミスタ検知温度
℃
177
169
163
159
145
100
時間
0
100
sec
5
10(sec)

【図６】


START
制御グループをAに設定
S9
検出温度100℃以下か？
No
S10
S18
Yes
前回のグループ情報を呼び出し設定
No
検出温度100℃を越えたか？
S11
Yes
タイマースタート
S12
No
1秒経過したか？
S13
Yes
140℃以下
検出温度は？
S14
155℃以上
140～155℃内
S15
制御グループをAに設定
制御グループをBに設定
制御グループをCに設定
END

【図８】


グループA
グループB
グループC
177℃
169℃
163℃
159℃
0°
70°
110°
160°
180°
0°
60°
100°
140°
170°
0°
50°
90°
120°
150°

PATENT ABSTRACTS OF JAPAN

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G03G 15/20

(21)Application number : 03-285571 (71)Applicant : CANON INC

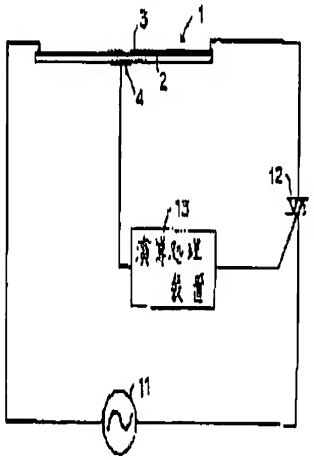
(22)Date of filing : 04.10.1991 (72)Inventor : AMIMOTO MITSURU

(54) CONTROLLER FOR HEATING BODY AND THERMAL FIXING DEVICE

(57)Abstract:

PURPOSE: To supply the suitable power and to keep the temperature of a heating body or a thermal fixing device constant without setting beforehand the resistance value of an energizing exothermic body or without energizing temporarily at the time of starting the copying for a thermal image fixing device.

CONSTITUTION: The devices are equipped with a detecting means 4 to detect the temperature of an energizing exothermic body 3 or a heating body 1 including it, a measuring means 13 to measure the hourly change rate of the temperature in the period when the energizing exothermic body 3 or the heating body 1 are set beforehand from the signal of the detecting means 4, and a power controller 12 to control the power supplied to the energizing exothermic body 3 based on the measured result of the measuring means 13.



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[Date of request for examination] 24.04.1997

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[Date of final disposal for application]

[Patent number] 2867766

[Date of registration] 25.12.1998

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]
[Claim 1] The control unit of the heating object characterized by to have the power control unit which controls the power which supplies to said energization heating element based on the measurement result of a measurement means measure the rate of a temporal response of the temperature within the period which said energization heating element or the heating object set up beforehand from the signal of a detection means detect the temperature of the heating object containing an energization heating element or it, and this detection means, and this measurement means.
[Claim 2] The heat anchorage device characterized by to have the power control unit which controls the power supplied to said heating element based on the measurement result of a measurement means to measure the rate of a temporal response of the temperature within the period which has a low-fever capacity wire heater, and has a detection means to detect the temperature of said heating element, and said heating element set up beforehand from the signal of said detection means, and this measurement means.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the control unit and heat anchorage device of the heating object containing an energization heating element or it.
[0002]
[Description of the Prior Art] In the image heat anchorage device using low-fever capacity linear heating objects, such as the former, for example, a ceramic heater etc., in order to maintain the temperature of a heating object at predetermined abbreviation regularity, the supply-voltage control to the energization heating element of a heating object measured detection temperature and the temperature set up beforehand, and was changing the supply voltage according to the comparison result (JP,2-259793,A). In order to press down the effect of dispersion in heater (heating element) resistance furthermore, the code of the resistance range which set up heater resistance beforehand was made to correspond, according to this code, the control group of said supply voltage was changed, or temporary energization was performed to (Japanese Patent Application No. No. 8016 [two to]), and a heating element, and there were some (JP,2-163787,A) which control power according to a temperature up degree.
[0003]
[Problem(s) to be Solved by the Invention] However, the time and effort which measures heater resistance and sets up the code to heater resistance beforehand with the DIP switch etc. was required of the above-mentioned conventional example. Or since the time amount which carries out temporary energization was required, to the application to the image formation equipment with which an instant start (quick-start nature) is demanded, it was not suitable.
[0004] Then, about the heating object containing an energization heating

element or it, without [without it sets up heater resistance beforehand, or] carrying out temporary energization, this invention supplies proper power and aims at offering the control unit which can carry out maintenance control of the temperature of a heating object at predetermined abbreviation regularity, and a heat anchorage device.

[0005]

[Means for Solving the Problem] the control unit of the heating object characterized by to be equipped this invention with the power control unit which controls the power which supplies to said energization heating element based on the measurement result of a measurement means measure the rate of the temperature within the period which said energization heating element or a heating object set up beforehand from the signal of a detection means detect the temperature of the heating object containing an energization heating element or it, and this detection means of a temporal response, and this measurement means -- it comes out.

[0006] moreover, the heat anchorage device characterized by to be equipped this invention with the power control unit which controls the power which supplies to said heating element based on the measurement result of a measurement means measure the rate of a temporal response of the temperature within the period which has a low-fever capacity wire heater, and has a detection means detect the temperature of said heating element, and said heating element set up beforehand from the signal of said detection means, and this measurement means -- it comes out.

[0007]

[Function] That is, after energization starting to a heating element, this invention measured the rate of a temperature change of the period set up beforehand, by changing the control group of a supply voltage according to a measurement result, without [without it sets up heater resistance beforehand, or] carrying out temporary energization at the time of copy initiation, if it was in the image heating anchorage device, could supply proper power and was able to keep constant the temperature of a heating object or a heat anchorage device.

[0008]

[Example]

<Example 1> (drawing 1 - drawing 5)

This example applies this invention to the image heat anchorage device of the film heating method which used the low-fever capacity linear heating object.

[0009] (1) The outline configuration of an anchorage device (drawing 1)

The **** set-up of 5 has been mutually carried out to the low-fever capacity linear heating object 1 as a heating object which was an endless-belt-like fixing film, was made to carry out fixed support under [between the left-hand side driving roller 6, the right-hand side follower roller 7, and both this roller 6-7], and was arranged, and guide-idler 6a arranged under the driving roller 6 between parallel these 4 member 6, 7, 1, and 6a.

[0010] It is made to serve as the tension roller of the fixing film 5, the fixing film 5 has a predetermined peripheral velocity clockwise with the rotation drive of the clockwise rotation of a driving roller 6, and the follower roller 7 is rotation drive **** without Siwa, meandering, and rate delay.

[0011] 8 is the pressurization roller which has the good rubber elastic layer of mold-releases characteristic as a pressurization member, such as silicone rubber. Make the descending side film part of the aforementioned endless-belt-like fixing film 5 pinch between the heating objects 1, and the opposite pressure welding has been carried out with the contact pressure of 4-7kg of total pressure to the inferior surface of tongue of the heating object 1 with an energization means by which it does not illustrate. It rotates to the counterclockwise rotation of the forward direction in the conveyance direction of the imprint material (record material) 9 from the non-illustrated image formation section (A).

[0012] Since heating fixing of a toner image is repeatedly presented with the fixing film 5 of the shape of an endless belt by which a rotation drive is carried out, it is excellent in thermal resistance, a mold-release characteristic, and endurance, and, generally uses preferably 100 micrometers or less of things of thin meat 40 micrometers or less. For example, it is the thing of the monolayer film of heat-resistant resin, such as polyimide polyether imide and PES-PFA (ethylene tetrafluoride-perfluoroalkylvinyl ether copolymer resin), or a compound layer film, for example, the heat-resistant film of 20-micrometer thickness, which gave fluororesins and the mold-release characteristic coat layers which added electric conduction material to it further, such as PTFE (polytetrafluoroethylene resin) and PAF, at least to the image contact side side at 10-micrometer thickness.

[0013] The low-fever capacity linear heating object 1 as a heating object the thing of this example The oblong heater substrate 2 which makes straight side the fixing film crossing direction (direction right-angled in the transit direction of the fixing film 5), Along with straight side, it becomes the field of the side which meets the fixing film 5 of this substrate 2 from the temperature sensing element 4 grade prepared in the energization heating element layer 3 and the heater substrate side of the opposite side as a heating element which carried out formation possession a line or thin band-like one. 1A is the heater base material which made this heating object support.

[0014] Heater base material 1A is a member which insulates and supports the heating object 1 to an anchorage device or image formation equipment,

JP,05-100755,A [DETAILED DESCRIPTION] http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

for example, can consist of high heat resistant resin, such as PPS (polyphenylene sulfide), PAI (polyamidoimide), PI (polyimide), PEEK (polyether ether ketone), and a liquid crystal polymer, these resin, composite with the ceramics, a metal, glass, etc., etc.

[0015] The heater substrate 2 has thermal resistance and electric insulation, and is an alumina substrate with a die length [the thickness of 1.0mm and a width of 10mm, and die length] of 240mm as an example. Or it is a composite substrate containing this.

[0016] The heating element layer 3 is an energization heating element layer of a linear or band-like low-fever capacity which coating of the screen-stencil etc. was carried out [capacity] and made the abbreviation central part of the inferior surface of tongue which is the film sliding side of a substrate 2 possess electric resistance ingredients, such as Ta2 N and silver palladium, in width of 1.0mm along with straight side as an example, and is energized from longitudinal direction both ends (drawing 2).

[0017] With the side which is a thermistor and formed the energization heating element layer 3, the temperature sensing element 4 is made to contact the 2nd page of the heater substrate of the opposite side, and is arranged. This example is made to detect the temperature of the heater substrate 2 by this temperature sensing element 4 as temperature of the heating object 1.

[0018] Image formation equipment carried out image formation actuation with the image formation start signal, and were conveyed from the image formation section (A) side to the anchorage device. The imprint material 9 which supported the non-established toner image 10 on the top face is guided at a guide, and advances between the fixing film 5 of the pressure-welding section N of the heating object 1 and the pressurization roller 8 (fixing nip section), and the pressurization roller 8. The fixing nip section N of the heating object 1 and the pressurization roller 8 is passed in the state of the lap together with the migration fixing film 5, receiving the compression force, without a non-established toner image side's sticking to the inferior surface of tongue of the fixing film 5 of a field migration condition, and producing field gap and wrinkling approach.

[0019] softening adhesion-ized 10a The toner image support side of the imprint material 7 receives the heat of the heating element layer 3 in a fixing film plane through the fixing film 5 in the process in which the fixing nip section N is passed in the state of press adhesion, and a toner image carries out elevated-temperature fusion, and makes it imprint material 9 fields.

[0020] The case of this example equipment is making separation with the imprint material 9 and the fixing film 5 perform, when the imprint material 9 passes the fixing nip section N and comes out.

[0021] Imprint material [finishing / image fixing / while showing around in a guide and resulting to a delivery unit, come to solidify the fixing film 5 and the separated imprint material, and] is outputted.

[0022] (2) do energization to the heating element layer 3 of the supply-voltage control heating object 1 over a heating element like [both ends / the / longitudinal direction] drawing 2 -- the alternating current from AC power supply 11 -- the power controlling elements 12, such as a triac, -- for example, carry out wave number control. A processing unit 13 controls the power controlling element 12 as follows based on the signal from the temperature sensing element 4.

[0023] Now, the target temperature of an anchorage device is fixed 165 degrees C, is the purpose which performs power control at the temperature of the near finely, and changes a power supply to five steps of temperature. Detection temperature is classified into a break and five steps according to 159 degrees C, 163 degrees C, 169 degrees C, and 177 degrees C. Corresponding to the classified temperature, power is supplied by the wave pattern of drawing 3 R> 3, for example, A group.

[0024] Here, a period is made to 20msec(s), it makes eight half waves a control unit, and the supply wave to the heating element layer 3 divides them into nine kinds of seven waves, six waves, five waves, four waves, three waves, two waves, one wave, and zero wave by making the maximum amount of supply into eight waves, and is controlled by five kinds of wave numbers to one control group. Moreover, it divides into three control groups of A-C here. And the flow shown in drawing 4 determines a control group.

[0025] The rate of a temperature rise is defined as time amount until it becomes 150 degrees C from 100 degrees C. First, the temporary law of the control group is beforehand carried out to for example, A group (S1). If energization is started, serially, a processing unit 13 will detect temperature, will choose the wave corresponding to temperature from A groups, and will supply power. Here, when initial temperature is 100 degrees C or more, it flies to S8. When initial temperature is 100 degrees C or less, it moves to processing of S3 (S2).

[0026] If detection temperature exceeds 100 degrees C (S3), a timer will begin count-up, and a count will be stopped if (S4) and 150 degrees C are exceeded (S5). Since a part for eight waves which are the maximum amount of supply is uniformly supplied until it exceeds 159 degrees C, the rate of a temperature rise becomes a thing reflecting own dispersion, environmental temperature, etc. of a heater.

[0027] It is made to move to the control group who chose the control group according to the rate of a temperature rise according to Table 1 (S6), and was chosen after exceeding 150 degrees C (S7).

[0028] Table 1 [0029]

[Table 1]

JP,05-100755,A [DETAILED DESCRIPTION] http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

0．90秒以内	グループC
0．90～1．40秒以内	グループB
1．40秒以上	グループA

Since the rate of a temperature rise is 1.28 seconds in drawing 5 , it has moved to B group's control. Drawing 5 carries out the blot of the time amount change of the temperature of the anchorage device in this example.
[0030] It already controls by S8 based on former group information as what is being energized at least at once before this.
[0031] <Example 2> (drawing 6 and drawing 7)
The 2nd example is described according to the flow of drawing 6 .
[0032] Power shall perform wave number control like [this example] an example 1. The rate of a temperature rise is defined as the temperature 1 second after exceeding 100 degrees C.
[0033] First, the temporary law of the control group is beforehand carried out to for example, A group (S9). If energization is started, serially, a processing unit 13 will detect temperature, will choose the wave corresponding to temperature from A groups, and will supply power. Here, when initial temperature is 100 degrees C or more, it flies to S16. When initial temperature is 100 degrees C or less, it moves to processing of S11 (S10).
[0034] If detection temperature exceeds 100 degrees C (S11), a timer will start (S12), and the temperature (S13) at the time of 1 second passing is detected.
[0035] It is made to move to the control group who chose the control group according to the rate of a temperature rise according to Table 2 (S14), and was chosen after exceeding 150 degrees C (S15).
[0036] Table 2 [0037]
[Table 2]

140℃以下	グループA
140～155℃以内	グループB
155℃以上	グループC

In drawing 7 , since the rate of a temperature rise is 145 degrees C, it has moved to B group's control. Drawing 7 carries out the blot of the time amount change of the temperature of the anchorage device in this example.
[0038] It already controls by S16 based on former group information as what is being energized at least at once before this.
[0039] <Example 3> (drawing 8)
As for power, this example shall perform phase control. It controls by the same for example, phase angle like drawing 8 as the above-mentioned example. And a control group is chosen according to the above-mentioned flow.
[0040]
[Effect of the Invention] According to this invention, as stated above, the rate of a temperature change of the period beforehand set up after energization starting to a heating element is measured, without [without it sets up heater resistance beforehand by changing the control group of a supply voltage according to a measurement result, or] carrying out temporary energization at the time of copy initiation, if it is in an image heat anchorage device, proper power can be supplied and the temperature of a heating object or a heat anchorage device can be kept constant.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] This invention relates to the control unit and heat anchorage device of the heating object containing an energization heating element or it.

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PRIOR ART

[Description of the Prior Art] In the image heat anchorage device using low-fever capacity linear heating objects, such as the former, for example, a ceramic heater etc., in order to maintain the temperature of a heating object at predetermined abbreviation regularity, the supply-voltage control to the energization heating element of a heating object measured detection temperature and the temperature set up beforehand, and was changing the supply voltage according to the comparison result (JP,2-259793,A). In order to press down the effect of dispersion in heater (heating element) resistance furthermore, the code of the resistance range which set up heater resistance beforehand was made to correspond, according to this code, the control group of said supply voltage was changed, or temporary energization was performed to (Japanese Patent Application No. No. 8016 [two to]), and a heating element, and there were some (JP,2-163787,A) which control power according to a temperature up degree.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, as stated above, the rate of a temperature change of the period beforehand set up after energization starting to a heating element is measured, without [without it sets up heater resistance beforehand by changing the control group of a supply voltage according to a measurement result, or] carrying out temporary energization at the time of copy initiation, if it is in an image heat anchorage device, proper power can be supplied and the temperature of a heating object or a heat anchorage device can be kept constant.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, the time and effort which measures heater resistance and sets up the code to heater resistance beforehand with the DIP switch etc. was required of the above-mentioned conventional example. Or since the time amount which carries out temporary energization was required, to the application to the image formation equipment with which an instant start (quick-start nature) is demanded, it was not suitable.
[0004] Then, about the heating object containing an energization heating element or it, without [without it sets up heater resistance beforehand, or] carrying out temporary energization, this invention supplies proper power and aims at offering the control unit which can carry out maintenance control of the temperature of a heating object at predetermined abbreviation regularity, and a heat anchorage device.

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MEANS

[Means for Solving the Problem] the control unit of the heating object characterized by to be equipped this invention with the power control unit which controls the power which supplies to said energization heating element based on the measurement result of a measurement means measure the rate of the temperature within the period which said energization heating element or a heating object set up beforehand from the signal of a detection means detect the temperature of the heating object containing an energization heating element or it, and this detection means of a temporal response, and this measurement means -- it comes out.
[0006] moreover, the heat anchorage device characterized by to be equipped this invention with the power control unit which controls the power which supplies to said heating element based on the measurement result of a measurement means measure the rate of a temporal response of the temperature within the period which has a low-fever capacity wire heater, and has a detection means detect the temperature of said heating element, and said heating element set up beforehand from the signal of said detection means, and this measurement means -- it comes out.

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OPERATION

[Function] That is, after energization starting to a heating element, this invention measured the rate of a temperature change of the period set up beforehand, by changing the control group of a supply voltage according to a measurement result, without [without it sets up heater resistance beforehand, or] carrying out temporary energization at the time of copy initiation, if it was in the image heating anchorage device, could supply proper power and was able to keep constant the temperature of a heating object or a heat anchorage device.

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EXAMPLE

[Example]
<Example 1> (drawing 1 - drawing 5)
This example applies this invention to the image heat anchorage device of the film heating method which used the low-fever capacity linear heating object.
[0009] (1) The outline configuration of an anchorage device (drawing 1)
The **** set-up of 5 has been mutually carried out to the low-fever capacity linear heating object 1 as a heating object which was an endless-belt-like fixing film, was made to carry out fixed support under [between the left-hand side driving roller 6, the right-hand side follower roller 7, and both this roller 6-7], and was arranged, and guide-idler 6a arranged under the driving roller 6 between parallel these 4 member 6, 7, 1, and 6a.
[0010] It is made to serve as the tension roller of the fixing film 5, the fixing film 5 has a predetermined peripheral velocity clockwise with the rotation drive of the clockwise rotation of a driving roller 6, and the follower roller 7 is rotation drive **** without Siwa, meandering, and rate delay.
[0011] 8 is the pressurization roller which has the good rubber elastic layer of mold-releases characteristic as a pressurization member, such as silicone rubber. Make the descending side film part of the aforementioned endless-belt-like fixing film 5 pinch between the heating objects 1, and the opposite pressure welding has been carried out with the contact pressure of 4-7kg of total pressure to the inferior surface of tongue of the heating object 1 with an energization means by which it does not illustrate. It rotates to the counterclockwise rotation of the forward direction in the conveyance direction of the imprint material (record material) 9 from the non-illustrated image formation section (A).
[0012] Since heating fixing of a toner image is repeatedly presented with the fixing film 5 of the shape of an endless belt by which a rotation drive is carried out, it is excellent in thermal resistance, a mold-release characteristic, and endurance, and, generally uses preferably 100 micrometers or less of things of thin meat 40 micrometers or less. For example, it is the thing of the monolayer film of heat-resistant resin, such as polyimide polyether imide and PES-PFA (ethylene tetrafluoride-perfluoroalkylvinyl ether copolymer resin), or a compound layer film, for example, the heat-resistant film of 20-micrometer thickness, which gave fluororesins and the mold-release characteristic coat layers which added electric conduction material to it further, such as PTFE (polytetrafluoroethylene resin) and PAF, at least to the image contact side side at 10-micrometer thickness.
[0013] The low-fever capacity linear heating object 1 as a heating object the thing of this example The oblong heater substrate 2 which makes straight side the fixing film crossing direction (direction right-angled in the transit direction of the fixing film 5), Along with straight side, it becomes the field of the side which meets the fixing film 5 of this substrate 2 from the temperature sensing element 4 grade prepared in the energization heating element layer 3 and the heater substrate side of the opposite side as a heating element which carried out formation possession a line or thin band-like one. 1A is the heater base material which made this heating object support.
[0014] Heater base material 1A is a member which insulates and supports the heating object 1 to an anchorage device or image formation equipment, for example, can consist of high heat resistant resin, such as PPS (polyphenylene sulfide), PAI (polyamidoimide), PI (polyimide), PEEK (polyether ether ketone), and a liquid crystal polymer, these resin, composite with the ceramics, a metal, glass, etc., etc.
[0015] The heater substrate 2 has thermal resistance and electric insulation, and is an alumina substrate with a die length [the thickness of 1.0mm and a width of 10mm, and die length] of 240mm as an example. Or it is a composite substrate containing this.
[0016] The heating element layer 3 is an energization heating element layer of a linear or band-like low-fever capacity which coating of the screen-stencil etc. was carried out [capacity] and made the abbreviation central part of the inferior surface of tongue which is the film sliding side of a substrate 2 possess electric resistance ingredients, such as Ta2 N and silver palladium, in width of 1.0mm along with straight side as an example, and is energized from longitudinal direction both ends (drawing 2).
[0017] With the side which is a thermistor and formed the energization heating element layer 3, the temperature sensing element 4 is made to contact the 2nd page of the heater substrate of the opposite side, and is arranged. This example is made to detect the temperature of the heater substrate 2 by this temperature sensing element 4 as temperature of the

JP,05-100755,A [EXAMPLE] http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

heating object 1.

[0018] Image formation equipment carried out image formation actuation with the image formation start signal, and were conveyed from the image formation section (A) side to the anchorage device. The imprint material 9 which supported the non-established toner image 10 on the top face is guided at a guide, and advances between the fixing film 5 of the pressure-welding section N of the heating object 1 and the pressurization roller 8 (fixing nip section), and the pressurization roller 8. The fixing nip section N of the heating object 1 and the pressurization roller 8 is passed in the state of the lap together with the migration fixing film 5, receiving the compression force, without a non-established toner image side's sticking to the inferior surface of tongue of the fixing film 5 of a field migration condition, and producing field gap and wrinkling approach.

[0019] softening adhesion-ized 10a The toner image support side of the imprint material 7 receives the heat of the heating element layer 3 in a fixing film plane through the fixing film 5 in the process in which the fixing nip section N is passed in the state of press adhesion, and a toner image carries out elevated-temperature fusion, and makes it imprint material 9 fields.

[0020] The case of this example equipment is making separation with the imprint material 9 and the fixing film 5 perform, when the imprint material 9 passes the fixing nip section N and comes out.

[0021] Imprint material [finishing / image fixing / while showing around in a guide and resulting to a delivery unit, come to solidify the fixing film 5 and the separated imprint material, and] is outputted.

[0022] (2) do energization to the heating element layer 3 of the supply-voltage control heating object 1 over a heating element like [both ends / the / longitudinal direction] drawing 2 -- the alternating current from AC power supply 11 -- the power controlling elements 12, such as a triac, -- for example, carry out wave number control. A processing unit 13 controls the power controlling element 12 as follows based on the signal from the temperature sensing element 4.

[0023] Now, the target temperature of an anchorage device is fixed 165 degrees C, is the purpose which performs power control at the temperature of the near finely, and changes a power supply to five steps of temperature. Detection temperature is classified into a break and five steps according to 159 degrees C, 163 degrees C, 169 degrees C, and 177 degrees C. Corresponding to the classified temperature, power is supplied by the wave pattern of drawing 3 R> 3, for example, A group.

[0024] Here, a period is made to 20msec(s), it makes eight half waves a control unit, and the supply wave to the heating element layer 3 divides them into nine kinds of seven waves, six waves, five waves, four waves, three waves, two waves, one wave, and zero wave by making the maximum amount of supply into eight waves, and is controlled by five kinds of wave numbers to one control group. Moreover, it divides into three control groups of A-C here. And the flow shown in drawing 4 determines a control group.

[0025] The rate of a temperature rise is defined as time amount until it becomes 150 degrees C from 100 degrees C. First, the temporary law of the control group is beforehand carried out to for example, A group (S1). If energization is started, serially, a processing unit 13 will detect temperature, will choose the wave corresponding to temperature from A groups, and will supply power. Here, when initial temperature is 100 degrees C or more, it flies to S8. When initial temperature is 100 degrees C or less, it moves to processing of S3 (S2).

[0026] If detection temperature exceeds 100 degrees C (S3), a timer will begin count-up, and a count will be stopped if (S4) and 150 degrees C are exceeded (S5). Since a part for eight waves which are the maximum amount of supply is uniformly supplied until it exceeds 159 degrees C, the rate of a temperature rise becomes a thing reflecting own dispersion, environmental temperature, etc. of a heater.

[0027] It is made to move to the control group who chose the control group according to the rate of a temperature rise according to Table 1 (S6), and was chosen after exceeding 150 degrees C (S7).

[0028] Table 1 [0029]

[Table 1]

0．90秒以内	グループC
0．90～1．40秒以内	グループB
1．40秒以上	グループA

Since the rate of a temperature rise is 1.28 seconds in drawing 5 , it has moved to B group's control. Drawing 5 carries out the blot of the time amount change of the temperature of the anchorage device in this example.

[0030] It already controls by S8 based on former group information as what is being energized at least at once before this.

[0031] <Example 2> (drawing 6 and drawing 7)

The 2nd example is described according to the flow of drawing 6 .

[0032] Power shall perform wave number control like [this example] an example 1. The rate of a temperature rise is defined as the temperature 1 second after exceeding 100 degrees C.

[0033] First, the temporary law of the control group is beforehand carried out to for example, A group (S9). If energization is started, serially, a processing unit 13 will detect temperature, will choose the wave corresponding to temperature from A groups, and will supply power. Here, when initial temperature is 100 degrees C or more, it flies to S16. When initial

temperature is 100 degrees C or less, it moves to processing of S11 (S10).
[0034] If detection temperature exceeds 100 degrees C (S11), a timer will start (S12), and the temperature (S13) at the time of 1 second passing is detected.
[0035] It is made to move to the control group who chose the control group according to the rate of a temperature rise according to Table 2 (S14), and was chosen after exceeding 150 degrees C (S15).
[0036] Table 2 [0037]
[Table 2]

140℃以下	グループA
140～155℃以内	グループB
155℃以上	グループC

In drawing 7 , since the rate of a temperature rise is 145 degrees C, it has moved to B group's control. Drawing 7 carries out the blot of the time amount change of the temperature of the anchorage device in this example.
[0038] It already controls by S16 based on former group information as what is being energized at least at once before this.
[0039] <Example 3> (drawing 8)
As for power, this example shall perform phase control. It controls by the same for example, phase angle like drawing 8 as the above-mentioned example. And a control group is chosen according to the above-mentioned flow.

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The outline block diagram of the heat anchorage device of an example
[Drawing 2] The block diagram of the power control circuit in an example 1 and an example 2
[Drawing 3] The supply-voltage wave group selection Fig. in an example 1 and an example 2
[Drawing 4] The flow chart of the power control in an example 1
[Drawing 5] The temporal response graph of the detection temperature in an example 1
[Drawing 6] The flow chart of the power control in an example 2
[Drawing 7] The temporal response graph of the detection temperature in an example 2
[Drawing 8] The supply-voltage wave group Fig. in an example 3
[Description of Notations]
1 Heating Object
2 Heater Substrate
3 Heating Element Layer
4 Temperature Sensing Element
11 AC Power Supply
12 Power Controlling Element
13 Processing Unit

[Translation done.]